

# Hobbies

## WEEKLY

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PATTERN SHEET FOR A  
PAIR OF BOOK-ENDS

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## HOW TO BUILD YOUR OWN CANOE

**T**HOUSANDS of canoes to this design have already been built and used all over the world on rapid rivers, lakes and open sea. The PBK11 design represents the simplest and smallest seaworthy craft. This canoe may be built with simple equipment from easily-obtained materials. With its shallow draught it will float almost anywhere that is wet, yet after its owner has gained some experience he can use it to shoot rapids or make coastal trips. There is plenty of stowage space for touring and camping kit, and the canoe is designed for a normal load of 300lbs.

### Straightforward Work

There are no complicated joints to cut, most parts being simply overlapped and screwed. It is an advantage to also glue the joints, using a synthetic resin glue, which is absolutely waterproof. There is a large number of screwed joints, and these should be tackled systematically, drilling a clearance hole in the top piece, countersinking it with a rose bit, and pushing a small bradawl into the lower piece before driving the screw.

The frames may be made from  $\frac{3}{4}$ in.

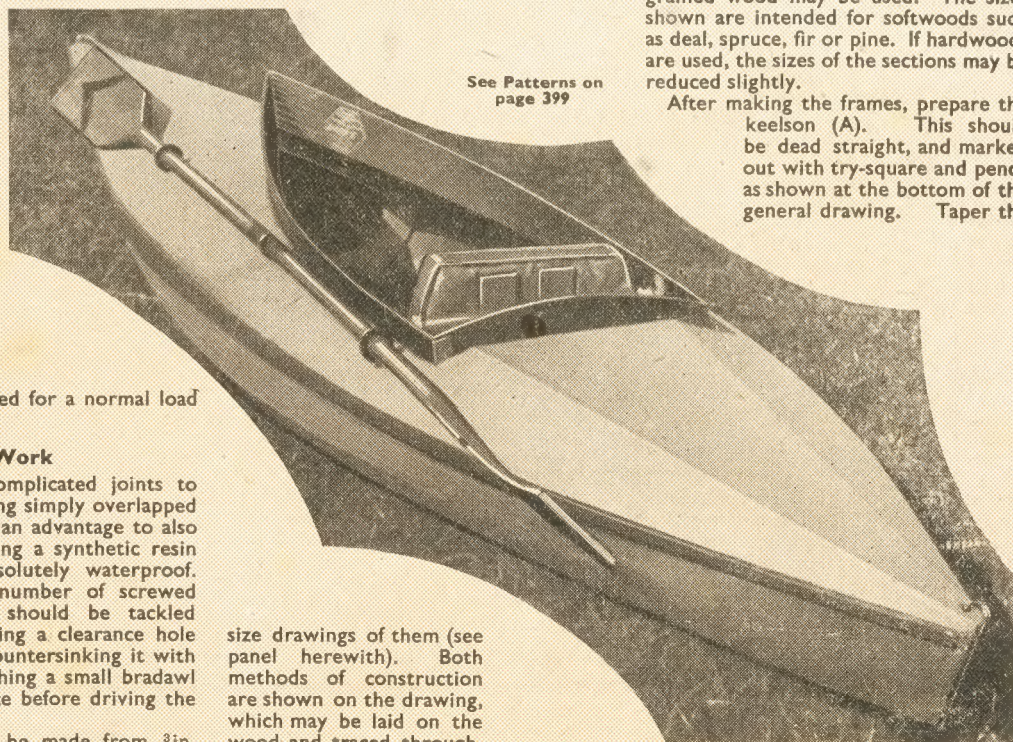
waterproof plywood, or built up from strips of 4ins. by  $\frac{3}{4}$ in. section softwood (which may be packing case material) overlapped and screwed. As the truth of the finished hull depends on the accuracy of the shapes of the frames, arrangements have been made to supply full-

Cut to shape with bow saw or stout fretsaw, and glasspaper the edges. Mark positions of stringers and other items shown on the drawings.

### The Wood to Use

For the rest of the canoe any straight-grained wood may be used. The sizes shown are intended for softwoods such as deal, spruce, fir or pine. If hardwoods are used, the sizes of the sections may be reduced slightly.

After making the frames, prepare the keelson (A). This should be dead straight, and marked out with try-square and pencil as shown at the bottom of the general drawing. Taper the



size drawings of them (see panel herewith). Both methods of construction are shown on the drawing, which may be laid on the wood and traced through.

All correspondence should be addressed to The Editor, Hobbies Weekly, Dereham, Norfolk.



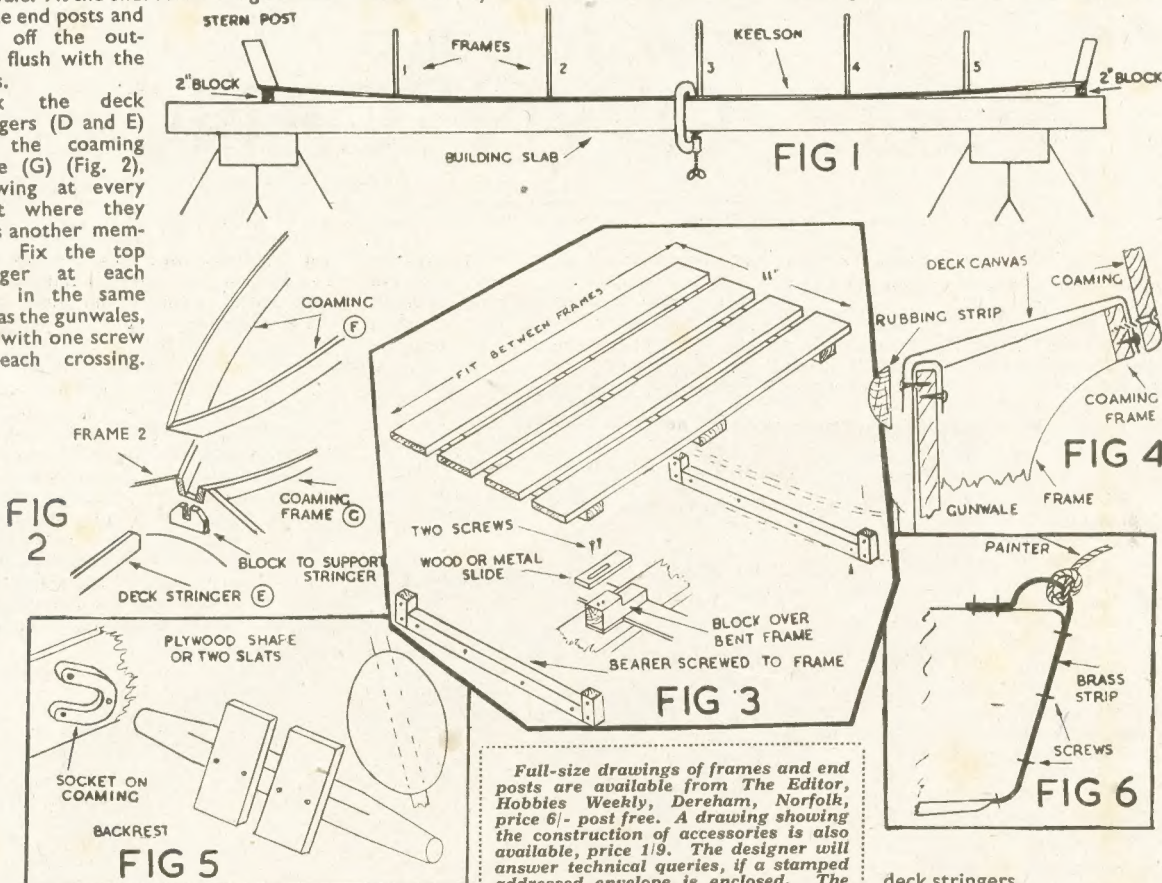
ends to 1in. from the last frame positions. Fix the keelson to the frames and end posts (also detailed on frame drawing) with two screws, and glue, at each position. Check that all parts are true with a try square.

### A Building Stool

Mount the job on a building slab (any stout plank with a flat surface), cramping it near frame (3) and raising the ends on 2in. blocks (Fig. 1). Stretch a string between the end posts and see that the centre line of each frame coincides with it. Sight along to check symmetry. If necessary, fix temporary struts to any frames needing them.

Fix the gunwales (B) with two screws at each frame. Work from centre to the ends, progressing a little at each side, frequently checking that the distance between frames is the same along each gunwale. At the ends screw the gunwales to the end posts and trim off the outside flush with the posts.

Fix the deck stringers (D and E) and the coaming frame (G) (Fig. 2), screwing at every point where they cross another member. Fix the top stringer at each side, in the same way as the gunwales, but with one screw at each crossing.



The structure will then be sufficiently rigid to remove from the building slab and turn over for convenience in fixing the other stringers. Fix the stringers in pairs. A shifting spanner is useful for holding and twisting the ends of the bottom stringers. Cut off the surplus material at the ends and round off with glasspaper.

The two bent frames (J) are made of  $\frac{1}{2}$ in. waterproof plywood sprung into place and screwed first to the keelson, then to each stringer, working outwards to the gunwales. Bottom boards may be

made of plywood stiffened by strips, as indicated on the sections on the general drawing, or built up from strips (Fig. 3). Make and fit the bottom boards and their bearers, at this stage.

Clean off all sharp edges, with plane and glasspaper, then give all the woodwork two coats of paint, or varnish if you want it to be really smart.

The canvas for the hull is best bought ready-proofed. Ideally, it should be 42ins. wide, but 36ins. is much more easily obtained and this will just do. Canvas is graded by its weight per square yard, and the most suitable grade is known as '12oz.'. A lighter grade may be used for the deck—balloon fabric is suitable. Alternatively, buy four yards of 72in. width and cut the hull and the deck side by side.

Mark a chalk centre-line on the hull canvas. Turn the framework upside-down and lay the canvas over it with the

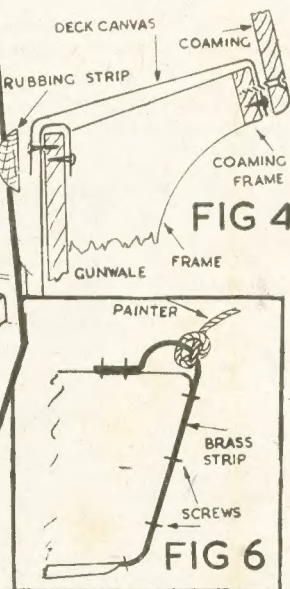
will not turn over, but must be tacked on the outside at the widest part of the canoe. Work a little from each side and progress from the centre towards the ends, tacking at about 2in. intervals.

Keep the pull at right-angles to the keelson and work out puckers as they occur. With stout canvas a few small creases are unavoidable and will not matter. Trim the canvas so that about 1in. is turned down inside. At the ends fold the surplus canvas over the ends and tack through. There will then be no cuts below the waterline.

### The Keels

Make the keel (K) and bilge keels (L). Taper them neatly towards the ends. Paint the meeting surfaces and screw from inside while the paint is still wet.

Lay the deck canvas over the canoe and fix by tacking to gunwales and coaming frames (Fig. 4). Do not tack to



Full-size drawings of frames and end posts are available from The Editor, *Hobbies Weekly*, Dereham, Norfolk, price 6/- post free. A drawing showing the construction of accessories is also available, price 1/9. The designer will answer technical queries, if a stamped addressed envelope is enclosed. The Copyright of the design is by the author: PBK11. Amateurs may build single craft for their own use.

centre-line over the keelson. Tack the canvas to one end post with  $\frac{3}{8}$ in. copper tacks, then stretch it along the canoe and tack to the other end post. Put further tacks at about 9in. intervals along the keelson.

Turn the canoe right way up and strain the canvas up to the gunwales at amidships. Turn it over and tack inside (Fig. 4). If 36in. canvas is used it

deck stringers.

If the canvas is ready-proofed, the deck may be left unpainted and the hull given one or two coats of good marine or outside household paint. This will be sufficient for the first season. If un-proofed canvas is used it may be treated with one of the proprietary water-proofing solutions before painting. Cover the joint between the deck canvas and gunwale with half-round moulding, screwed at about 6in. intervals.

The cockpit coaming (F) may be made



of softwood, stained and varnished, but it will look more attractive if made of varnished mahogany. Each side of the coaming tapers from 4ins. wide forward to 3ins. wide aft. Cut the forward mitre first, then bend the sides into

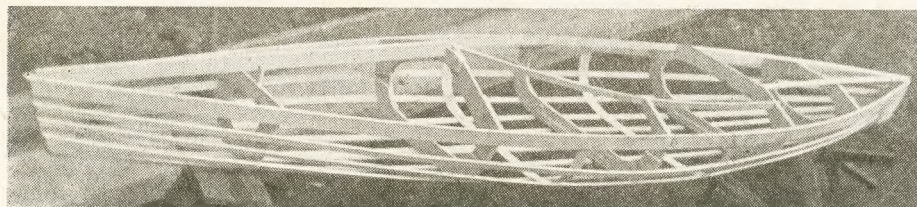
shape, drilling and screwing to endposts (Fig. 6).

This completes the canoe and you can celebrate the launching. Unless you are a skilled woodworker it is advisable to buy a professionally-made paddle. You

need a double-bladed one 7ft. or 8ft. long.

For those who want to add to their canoe there are all sorts of accessories which can be made. A drawing and instructions are available for making paddles, spray covers, paddle brackets, flag sticks, trolley for transporting, as already mentioned.

All these drawings and any answers to constructional difficulties will be dealt with by the author if you send your application, with stamped addressed envelope to The Editor.



shape and mark their length, and cut them a shade too long to ensure a snug fit. Fix to the coaming frame with screws at about 6in. intervals. Cut the back of the coaming with a smooth curve to its top.

### Backrest

The backrest shown on section 'Y', consisting of two short strips attached to the back of the cockpit, will be found to be in the right place for paddling with a load of camping kit under the foredeck. If the canoe is to be used much without kit on board it will be found to trim better with the seat farther forward, so a separate backrest which fits into sockets on the coaming about 6ins. forward of the back of the cockpit should be made (Fig. 5).

Fix large screw eyes in stem and stern posts for painters, or better still, bend a strip of  $\frac{3}{8}$ in. by  $\frac{1}{8}$ in. brass or copper to

### MATERIAL SCHEDULE

Part	Name	No. off	Length	Width	Thickness
A	Keelson	1	10ft. 9ins.	2ins.	in.
B	Gunwales	2	11ft. 9ins.	2ins.	in.
C	Stringers	8	11ft. 9ins.	in.	in.
D	Deck stringers	2	3ft. 6ins.	in.	in.
E	Deck stringer	1	4ft. 0ins.	1ins.	in.
F	Coaming	2	4ft. 6ins.	4ins.	in.
G	Coaming frames	2	4ft. 6ins.	in.	in.
H	End posts, cut from	1	1ft. 9ins.	3ins.	2ins.
I	Bottom boards	2	12ins.	12ins.	in. ply
—	and	8	2ft. 0ins.	1in.	in.
—	or	8	2ft. 0ins.	2ins.	in.
J	Bent frames	2	3ft. 3ins.	1ins.	in. ply
K	Keel	1	10ft. 9ins.	1in.	in.
L	Bilge keels	2	6ft. 0ins.	in.	in.
M	Rubbing strips	2	11ft. 9ins.	in.	in. half round

Frames	in. plywood	or	4in. by in. strips
No. 1	14ins. by 11ins.		3ft. 6ins.
2	23ins. by 14ins.		5ft. 6ins.
3	28ins. by 11ins.		4ft. 0ins.
4	26ins. by 11ins.		5ft. 6ins.
5	18ins. by 9ins.		4ft. 6ins.

Canvas: 1 piece 12ft. by 42ins. (or 36ins.)  
1 piece 12ft. by 30ins.

Copper tacks:  $\frac{1}{2}$ lb., in. long  
Brass screws: 2 gross, in. by 6

### Keeping Live Moths

**I** HAVE made my daughter a specimen box in which to keep her live butterflies, moths and caterpillars and would appreciate advice on general management, e.g., grasses and herbs to grow in the box, insects to avoid, soil composition, etc. (W.W.—Peterborough).

**I**T is difficult to answer your query in detail, for the reason that various species of moths, butterflies and caterpillars have widely different feeding habits. These differences can be read about in most books dealing with insect life, and from them the most appropriate food stuffs can be provided.

In general, a fairly rich, light loamy soil will be best. Plant a few tufts of ordinary meadow grass, wild flowers, and two or three young cabbages; also put in some grated carrot, apple, and any odd bits of available fruits.

It also helps to have a fern or some fairly densely leaved plant to provide shade for night moths.

### Leather Lettering

**I** DO a great deal of leatherwork, and I would like to know how initialing or lettering is done. (J.R.—Dublin).

**L**ETTERING on leather is usually done with 'letter' punches, slightly warmed and driven down with a chaser's hammer.

The gilding can be done with gold leaf, in which case the letters have to be very carefully coated with gum, or preferably with gold size, and the gold leaf pressed on to it while still moist.

Gold paint can be used in the manner of printing, by pressing the letter punch on a pad charged with the paint, and applying promptly but carefully to the leather.

### 'Tinny' Gramophone

**P**LEASE advise me on how to stop a winder type gramophone from sounding tinny. (C.R.—Wallington).

**T**HE ordinary type of spring driven gramophone is often lacking in the musical quality associated with electrical reproducers, but the quality known as 'tinny' can be caused by many things including a worn record, improperly designed tone arm, loosely fixed metal parts, worn needles, and slackly adjusted pivot points on the needle holder. The Stylus may also be inadequately fixed to the diaphragm, a defect that can be remedied by melting a little hard wax around the stylus and its junction with diaphragm.

Other things which may help to reduce the 'tinny' noise, are to cover the tone arm with felt or cloth, reduce the record speed a trifle, use a thick needle and make sure all metal parts are securely fixed.

### Shellac

**I** WAS very interested in your article on shellac, but it did not state how the gum is made. (A.M.—Galway).

**N**ORMALLY, shellac when used as a gum or adhesive is made by crushing the lump shellac into powder and dissolving in methylated spirit or wood alcohol. Sometimes a little resin is added, in which case the shellac solution is warmed, using great care to avoid a flare up, in a double saucepan, the outer pan filled with boiling water.

### Boat Building

**I**S it possible for an amateur carpenter to build a 9 to 14ft. boat suitable for sea sailing, and also adaptable for an outboard engine? (E.G.—Bangor).

**I**T is possible for an amateur carpenter to make a boat, but if it is intended to go in for sailing, it is imperative that the boat be properly designed and efficiently constructed.

Moreover, it is essential that the user has an adequate knowledge of seamanship as the handling of a small boat in a sea way, is a matter for the expert.

Bearing these matters in mind; if it is still intended to proceed, the best course to pursue is to obtain a design from a qualified naval architect, whose name and address can be had from such books as Yachting Monthly.



# For use in the house or garden you have need of a FOLDING CARD TABLE

**T**HIS light weight folding table can be easily made if a small quantity of wood is available. Deal will serve, though a tougher wood like beech or oak would make a stronger article. Red deal, if you can get it, is better than the white variety for an article of this type; either kind must be free of any knots or shakes.

The wood strips for the legs are 1in. wide and  $\frac{3}{4}$ in. or  $\frac{1}{2}$ in. thick. Fig. 1 gives dimensions of the leg frames. The legs are joined together in pairs, and fit, one within another to fold up. The table, being of the folding variety, is most convenient for carrying about the house, and storing away when not in use.

## The Legs

The four legs are planed to the size and lengths given, and the tops rounded to a semi-circle. Frame (A) should be made the given distance in width by the bottom rail, which is cut from  $\frac{1}{2}$ in. plywood and screwed across at 6ins. up from the bottom. In the centre of the semi-circular tops bore a hole to fit a stout brass screw, which will form a pivot, for the frame to fold up. This is shown in inset (A).

Now place the second pair of legs between the frame (A), allowing room between for a washer each side. Mark the centre of each of the legs, and fit the inner legs to the outer ones with a stout brass screw, as in detail (B). Place the washers mentioned between the legs to lessen friction.

## Tenoned Rails

This being satisfactory, screw a plywood bottom rail across frame (B) also, and across the top a wood rail, this being 1in. square. This rail can be tenoned across, or just glued and screwed; either will do if the joint is made firmly. The tops of the legs and

rail are planed semi-circular, as in frame (A).

Both frames should now fold together, and a point to notice to facilitate this is the position of the lower plywood rails which should be on the outside of the frames. The side view of these frames, seen in Fig. 1, show quite plainly how to fix them for satisfactory folding. The bottom ends of the legs can be slightly rounded off, or left as they are, as preferred.

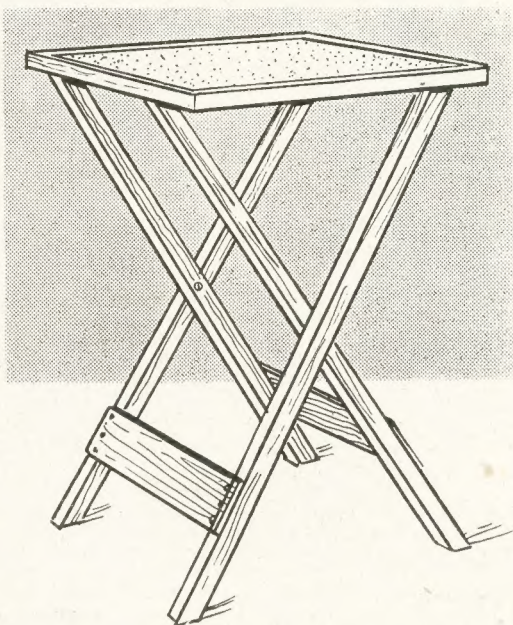
## Table-Top Frame

The frame for the table top, seen in Fig. 2, is made to the size given from strips of wood, 1 $\frac{1}{2}$ ins. wide and  $\frac{1}{2}$ in. thick. Join the frame at its corners with glue and nails, or a halved joint, as preferred. The frame (A) is then fitted with brass screws, as in the diagram, to the extreme right-hand end of the top inside.

Use flat-headed screws and countersink the heads, as these must not project or they will interfere with the folding of the frames. When boring the holes for these pivot screws, and this applies to the middle legs screws as well, bore sufficiently large in one leg for the shank of the screw to fit in, and a smaller hole in the other leg, or in the case of the table top, in the top frame, for the threaded part of the screw to cut its way in. Using this method, both legs and table top should move without the pivot screws becoming loose.

## Wood and Baize Top

Now cover the top frame with a



sheet of  $\frac{1}{2}$ in. plywood, gluing and pinning it down. Trim the edges of the plywood level with the outside of the frame. At this juncture lay the table top on to a sheet of stiff paper and run a pencil round its edge to mark its exact size to the paper. Cut this out, it will prove a useful pattern for the baize cover to be applied afterwards.

Cut 4 strips of wood,  $\frac{3}{4}$ in. thick, and 1 $\frac{1}{2}$ ins. wide, and 1ft. 10ins. long each. These are to be glued and nailed round the table frame, being neatly mitred at the corners. This edging should rise just  $\frac{1}{8}$ in. above the top of the table, as in detail Fig. 3. Clean off the work and stain a nice oak or mahogany colour.

Finish the job of woodwork with a coat or two of varnish. It will, perhaps, be more convenient if the staining and varnishing of the legs is done before they are pivoted together.

Take the paper pattern and lay it on a suitably sized piece of green baize. Place

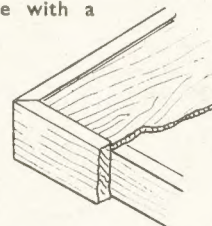


Fig. 3—Detail of table edging

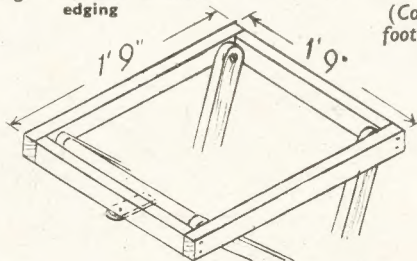


Fig. 2—Detail of top, and leg fixing

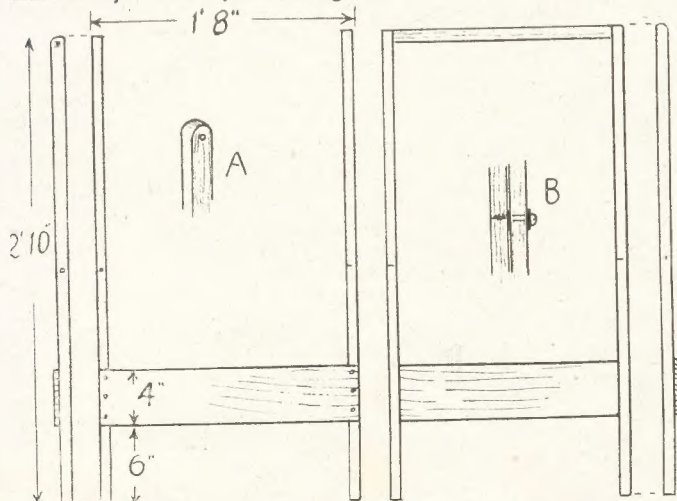


Fig. 1—The framework and side view of each pair of legs

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# Small pieces of odd wood and metal make a practical MATCH AND ASH STAND

THE attractive looking ashtray and match holder shown in Fig. 1 is made from odd small pieces of wood and metal. If possible get two pieces of oak 4ins. square, one piece being, say,  $\frac{3}{8}$ in. thick for the lower base, and one piece  $\frac{1}{2}$ in. thick for the upper layer forming the recess for the ash-tray.

Upon the upper layer is fixed a raised metal support for the matchbox, the outer cover portion of which only is used and is slid on to the metal holder shown.

The base is  $\frac{3}{8}$ in. wood 4ins. square, the octagonal shape being got by carefully setting out, as Fig. 2 shows. First draw in the 4in. square and from each of its corners describe a quarter circle with the compasses set at  $2\frac{1}{2}$ ins. radius. That is, set the compass to meet the exact centre of the square, as indicated in the diagram. Join the points as shown and, pinning the pattern to the wood, prick off these points into it and complete the octagon ready for cutting with the fretsaw.

## Twopiece Base

The upper layer of the base, as (B) in Fig. 3, is set out in a similar manner to (A), being the main piece below. The outline of piece (B) is given in Fig. 4 in the solid lines, and this again is set out on  $\frac{1}{2}$ in. wood and cut out. Glue the two pieces together and clamp up.

Being of wood, some protection must be given against the hot ash, and to this end a neat little metal tray is formed from brass or copper or even tin which could be painted or japanned over. The tray consists of an octagonal piece of metal set out 3ins. square. It has an inner shaped piece for sinking in the depth of the wood overlay, marked out  $2\frac{1}{2}$ ins., as seen in the lower diagram in Fig. 4.

The metal can be cut with a pair of tinman's snips or an old pair of scissors. Snip out the V-shaped pieces of the metal so that when each of the eight sides is angled up and soldered the appearance is as (C) in Fig. 4, three only of the upturned sides being shown here, the others lying flat and made ready for

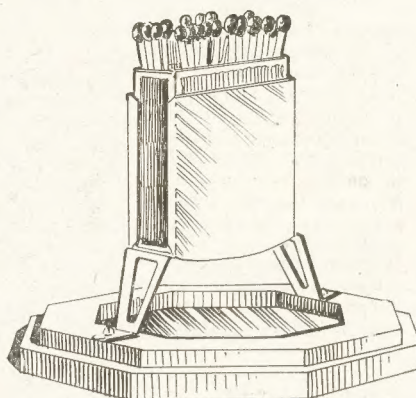


Fig. 1—The complete article in use

angling up. It should be mentioned that the metal tray must fit fairly loosely in the opening so it can be easily removed for emptying and cleaning.

We next come to the making of the box support which stands above the tray. A development plan of this is given in Fig. 5 with all measurements included for the proper setting out and the lines for bending up the metal. Rather stouter metal may be chosen for this support than that used for the tray.

## Metal Shapes

Carefully draw out the pattern on to thin paper and then gum this to the metal. See there are no wrinkles left when the gum is dry. Use a metal-cutting fretsaw for the pierced parts and the outline, and use a fine file or emery cloth for trimming up the edges at completion. See there are no sharp corners or edges left which might injure or cut the fingers. Drill the two holes neatly for the two round-head screws which will hold the bracket to the base.

The two curved sides measuring  $1\frac{1}{2}$ ins. long by just over  $\frac{1}{2}$ in. or  $\frac{1}{4}$ in. wide are to be bent down from the dotted lines shown. Additional stiffening is afforded by these two 'lips' which again add character to the design.

An average size matchbox measures 2ins. long,  $1\frac{1}{8}$ ins. wide and  $\frac{1}{8}$ in. thick, but in making the container for it, allowance must be made for a more or less loose fit. The container sides are made 2ins. deep which allows the matchbox to project  $\frac{3}{8}$ in. above the top, as seen in the sketch of the finished article at Fig. 1.

## The Box Container

In Fig. 6 we see the metal required for the container laid out in the flat and ready for the angling up. See the three flat surfaces contained in the whole piece of metal are really quite flat before the actual bending is taken in hand, because this work of flattening cannot be done when once the two sides are bent up.

The two holes to take the rivets which hold the container to the support are drilled exactly to coincide with those in the support. If desired, and should the worker have no experience in riveting, the container could be soldered to its support. Note in the smaller circled sketch of the made-up container how the edges are turned at right angles to the sides to hold the matchbox in place.

## Box Holder

Inside the container is a block of wood 1in. high and made to fit up inside the cover portion of the matchbox. The block should be a sliding fit in the lid, and both should nicely wedge up in the container. The matches rest on top of the block of wood and, therefore, project beyond the top of the cover part. This makes for ease in handling them and withdrawing, as can be clearly seen in the picture at Fig. 1.

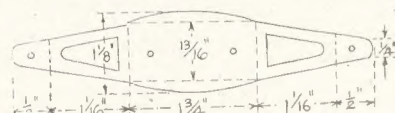


Fig. 5—Marking out metal support

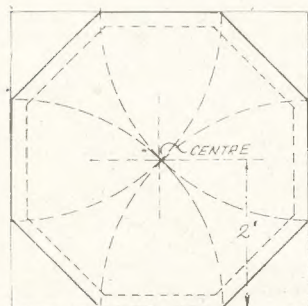


Fig. 2—Marking the base

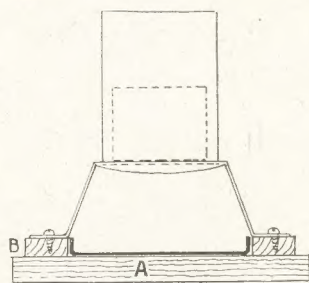


Fig. 3—Section of bases and holder

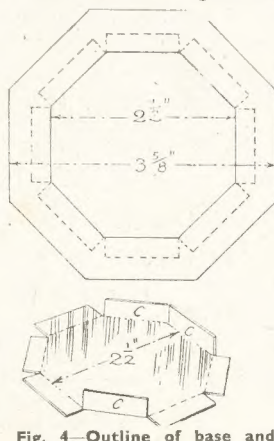


Fig. 4—Outline of base and tray

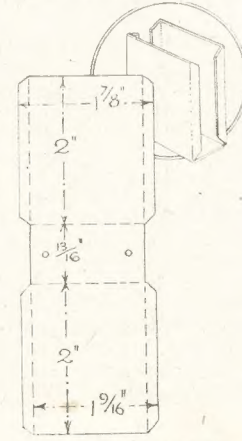


Fig. 6—Shape of holder



# How an empty oil drum can be converted to A SMALL GARDEN ROLLER

**W**ATER-FILLED rollers are, of course, no novelty, having been made and used for many years. The salient feature of the design is in the ease of transportation and storage, which is facilitated by the release of the water ballast. A garden roller constructed on this principle has undeniable advantages when compared with the more usual kind of roller, and is not at all difficult to construct.

The cylinder of the roller is adapted from a disused 5 gallon oil drum. The

constructed from a strong hardwood, such as oak or ash. The side members should be 1in. width by 2ins. depth by 4ft. length.

Before assembling, the axle bearings must be installed. These are constructed from thick brass tubing, 1in. in length and of the same internal diameter as the external diameter of the axle shafting. Iron tubing should definitely not be used for this purpose, as when the roller is stored during the winter months, the bearings may become immovably rusted with the axle shafting.

## Axle Shaft

One end of each of the bearings is closed by brazing a disc of brass into place (Fig. 2 A) to locate the axle shaft correctly into position. Two suitably-sized holes are drilled near the end of the side members and the bearings inserted (Fig. 2 B). Before inserting, however, a small locating hole is drilled midway in the bearings and when in position in the frame is locked into place by a screw (Fig. 2 C). If the point of the screw projects through into the bearing, it should, of course, be carefully removed with a file.

The framework is assembled by inserting the axle shafting in its bearings and screwing or bolting the cross-strut (Fig. 1 C) and the handle (Fig. 1 D) into position.

## The Rail Handle

The cross-strut and handle are constructed from similar sized wood to that employed on the side-members. They should be screwed, or preferably bolted, securely into position. Two screws or bolts should be used on each end to

prevent any lateral movement occurring. The edges of the handle should be nicely rounded off and smoothed with glasspaper to provide a comfortable grip.

The roller can be finished with any bright hard-wearing enamel and when dry is ready for use. Preparatory to using, it must, of course, be filled with water. Any quantity up to 5 gallons may be used, according to personal requirements. When filled to capacity, the roller weighs approximately 50lbs. or so,

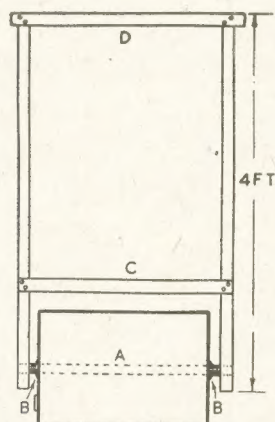


Fig. 1—Side views of parts

drum must, of course, be perfectly water-tight, free from dents and also have a screw-on type of filler cap. Some drums are fitted with integral telescopic draw-off taps but these drums are not suitable.

Having selected a suitable drum, the carrying handle fitted on the top must be removed. The best way is to cut the handle through with a hacksaw, as near the top of the drum as possible, and then flatten the cut ends with a light hammer.

## The Axle

The axle is best constructed from iron piping or barrelling. Iron rod may be used, but the piping is to be preferred, as it resists bending stresses to a far greater extent than does the rod. The size of piping required is approximately 1in. external diameter, and 6ins. longer than the overall length of the drum.

A hole 1in. in diameter is drilled exactly central in both ends of the drum and the piping passed through until 3ins. projects from either end (Fig. 1 A). The pipe is then welded or brazed in this position (Fig. 1 B). This job is likely to be outside the province of most handymen, but can be carried out by the local garage or engineer's shop at a reasonable cost.

## Framework

The framework of the roller is con-

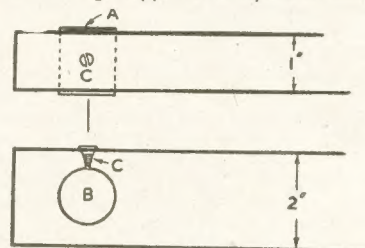


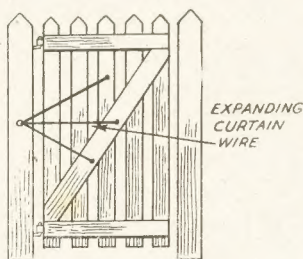
Fig. 2—Plan and elevation showing bearing

and is adequate for the average garden. The screw-filler cap must have a sound washer, otherwise a continual water leakage will occur at this point which will necessitate an occasional refilling with water.

The roller should not be used on very stony paths and runways, as the drum, being of thin metal would very quickly dent. If the roller is required for very rough usage as described, it should be filled with a cement ballast which is allowed to harden before being used. With a cement filling, however, the roller is inclined to be heavy and clumsy and not so easily transportable as the water-filled roller.

## A Garden Gate Tip

**A** CHEAP and neat way of keeping a garden gate closed after use, is to get some expanding curtain rod wire.

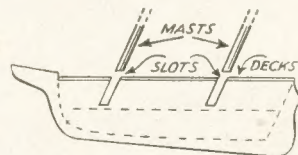


Cut it into three equal lengths and fix some curtain eyes on each end. Three hooks are put at an equal distance on the middle bar on the gate with one large hook on the gate post itself. Then radiate the three pieces of wire from the gate post hook and fix each wire on one

of the hooks which has been fixed on the middle bar of the gate.

## Ship's Masts

**T**HE best method of 'raking' the masts of ship models, is to cut slots at the correct angle, in the centre board of the model, as illustrated. The holes in



the deck that take the masts will show the position of these slots, and when the side pieces are added, the result will be seen as an opening passing through the deck into the hull. When the masts are inserted they will assume the correct slope and be held quite tightly.



# Several advantages for the radio amateur in making a MAINS CONVERSION

**U**SERS of mains-operated receivers enjoy several advantages. Running costs are very low, compared with batteries; the trouble of renewing the batteries from time to time is eliminated and mains type valves are more efficient. Therefore the conversion of a battery receiver into one intended for mains operation is well worth considering. The conversion is particularly easy with small, home-constructed two or three valvers.

## Circuit Differences

With receivers of this kind the tuning coils, tuning condensers, reaction, wave-change and associated circuits will need no alteration. It is only necessary to change the battery valves for suitable

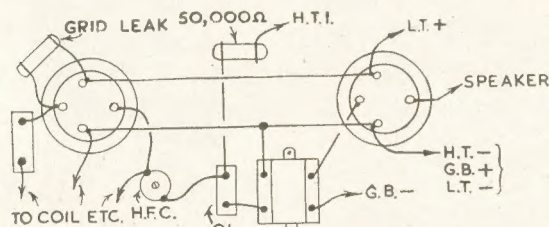


Fig. 1—Valve wiring in a battery receiver

mains types and to add a rectifier circuit so that filament and high tension supplies are obtained from the mains. Grid bias is obtained by making use of the voltage drop across a resistor, and so all batteries are discarded.

Mains valves use higher voltages than their battery-operated counterparts and have an indirectly-heated cathode instead of a directly-heated filament, and it is these facts which make some changes essential.

## Battery Circuit

The relevant part of a battery-operated receiver is shown in Fig. 1 in which all tuning and associated circuits are omitted because these may take any form and need no alteration. With three valvers, or sets using different forms of coupling between the valves, the modifications required will run on the same lines.

The valveholders should first be replaced by holders suitable for mains valves; these have an additional socket at the centre, for cathode connection. Other pin connections remain the same as with the battery valves.

## Wiring Modification

Fig. 2 shows the changes that must be made. The filament sockets are now wired up with twisted flex, all battery leads, etc., being removed. The Earth and H.T. Negative line, which went to one filament, is now taken to the central cathode socket.

To obtain bias for the output valve

(connected to the speaker), resistor R2 is added as shown, with C1 in parallel with it. C1 is a bias condenser of about 25 mfd. 50 volts working. Take care it is connected in the polarity shown.

In Fig. 1 the 50,000 ohm resistor was taken to a tapping on the H.T. battery, and probably received about 72 to 100 volts. Now, however, it will receive 250 volts. As this will probably make reaction very fierce, a further resistor of about 50,000 ohms or so, marked R1 in Fig. 2, is added in series. This resistor is not critical, merely reducing the detector anode voltage. If reaction still proves fierce, its value may be increased, if desired.

If resistance capacity coupling is used between the valves in the battery set, this can remain unchanged. The use of mains valves will in any case usually bring about a considerable increase in volume.

## Transformer Coupling

If direct transformer coupling is used, with the primary of the transformer connected between the High Frequency Choke and H.T.1., connections should for preference be changed to those shown in Figs. 1 and 2. This is because the new valve type will pass more current, than the battery detector previously employed, and if the transformer is not very robust its primary winding may in time fail. By feeding the primary through a condenser of about .01, as shown, this is avoided as no direct current now passes through the transformer windings.

If the speaker is a moving coil one with

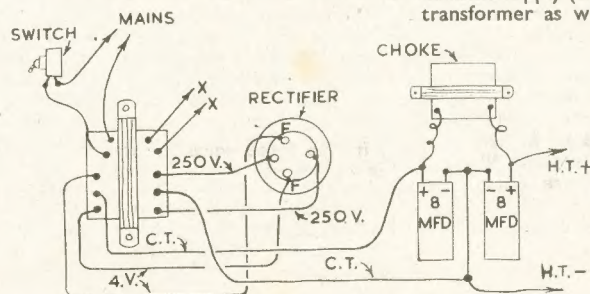


Fig. 2—Wiring modified for mains valves

transformer, no change will be required here. However, the mains output valve will pass a much larger current than the battery valve; therefore the old-fashioned magnet cone speakers (if used) will not now be suitable. A further point to watch is that the speaker transformer is capable of carrying the anode current required. Most ordinary speaker transformers can do this, but if the transformer is a very small one it should be discarded and a new transformer suitable for mains output valve bought.

The primary of the speaker transformer is connected between output valve anode and H.T. Positive.

For detector, an indirectly heated

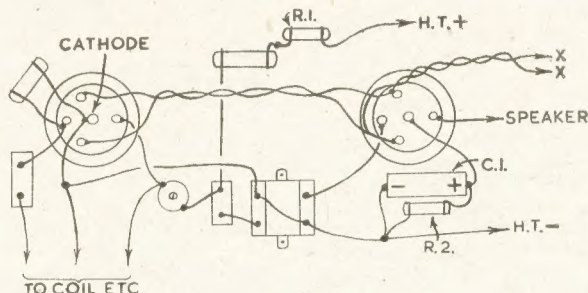


Fig. 3—The power supply unit

triode such as the Osram MH41 or any of its equivalents can be used. This requires 4 volts at 1 amp for the heater. For output, a valve such as the ML4 can be used, and with this R2 should be 400 ohms.

## Valves and Bias

Actually, many other valve types may be used with perfect success, but each output valve will require a particular value for R2, which develops the appropriate grid bias voltage. The value here will usually lie between 300 and 600 ohms, but results will not be at their best unless the correct value is used, and this will be found on the valve manufacturer's leaflet, or may be looked up in valve reference books.

It is suggested all the valves used be the 4 volt 1 amp. type. However, 6.3 volt valves are particularly easy to obtain cheaply from ex-service stores, and may be used instead, provided the filament supply (obtained from the mains transformer as will be described) is of the appropriate figure. These valves will, however, require valveholders of different shape. Except for this they are similar.

When the change is made to mains-operation, it is quite in order to use a

(Continued foot of page 395)



# A Craftsman's Notebook

## Cigarette Card Cavalcade

ALWAYS having a certain interest in this direction I was pleased to find, during a visit to Leeds, a 'Cigarette Card Cavalcade' being staged (temporarily) in the city museum.

The exhibits were loaned by members of the Cameric Club, and learning that the membership of this Cigarette Card Society is over 400 one realizes how interest in the hobby continues. Even though it is nearly ten years since such cards had to be discontinued to save paper material. The club was founded in 1935.

Though the majority take the well-known form of picture front and reading matter back, there have been several novel variations. Looking round the cases I discovered some which were new to me. Like the Club Colour Badges printed with the colours of different football clubs and specially shaped to fix in buttonhole or hat. Others reminded me of cards I have myself but never managed to complete into sets—prints on silk, cut-outs, sectional cards to put together into a large complete picture, stereoscopic scenes, etc.

There were also examples of what I call curios. That is, cards having some irregularity or different text. For an example of this rare occurrence I can turn to one of my own albums, number 34 of a series called 'Famous Bridges' bearing the title *Widnes Transporter Bridge* on one card and *Runcorn Transporter Bridge* on another, both being alike in other respects.

## Horseshoe in a Tree

HOME woodworkers who utilize dismantled packing cases and oddments of old wood know the importance of looking it over carefully to see there are no nails left in likely to damage the tools. Sometimes these may be broken or bent over and almost embedded, hardly noticeable at a casual glance.

## Folding Table—(Continued from page 388)

a sheet of cardboard beneath the baize and pin the pattern to the baize to hold both together. Then, with a straight-edge, laid against each edge of the pattern in turn, trim the baize to the pattern with a sharp knife.

Have ready a pot of hot glue, rather thin, cover the plywood top with the glue and rub the baize well down to it. If carefully cut it should just fit, but if too big, the surplus can be cut away afterwards with a penknife. A neat job results if this is carefully done. Get the baize pressed flat and free from 'bubbles' by running over it with an iron which is not too hot.

The varnishing and staining of the woodwork will not, of course, be

Amateurs using secondhand material are not the only ones who have to be cautious in this respect. Timber merchants come up against obstacles—and what is more, there may be unseen foreign bodies in newly-felled timber arriving in their yards.

When I was looking at specimens of different kinds of wood I saw some examples of the curious way objects can be lost in growing trees, having been either intentionally or accidentally affixed to the trunk many years ago and in due course become grown over.

Large nails were fairly common, and in another cut log a few links of hefty chain had been revealed. Another unusual object brought to light at the sawmill after lying hidden many years was a horseshoe.

One can imagine the effect such things could have on tools, but fortunately it is possible to detect the presence of these metal objects by means of a magnetic metal indicator, even when they are as much as 9in. deep.

## What Sound Films are Like

IN early Talkies the sound was on a separate disc like a big gramophone record which had to be played in exact step with the film. This sound-on-disc system, however, was soon superseded by the more convenient sound-on-film where the sound, after being recorded separately, is printed on the same film as the pictures. The narrow track runs down the length of the film alongside the pictures.

On projection apparatus the special equipment which reproduces the sound is situated below the lens which projects the picture, so to synchronise the two the sound must be some 14ins. ahead of the picture to which it corresponds. Thus, if we were to snip out a single frame (picture) from a cinematograph film the adjoining portion of sound track would not relate to that particular picture, but to another farther back.

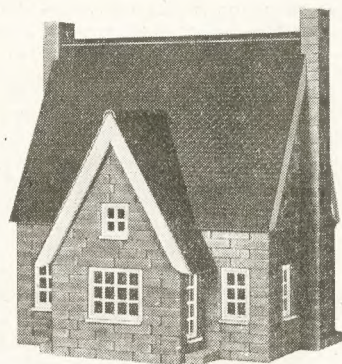
continued to the plywood top, but it is as well to let it stray over the edging for about a  $\frac{1}{2}$ in. in case the baize is just a trifle too small to cover the space.

A trifling shortage here will not then be so noticeable as it would if the white wood showed up at the joint. The stain and varnish will help to hide any such defect, but it is always wiser to cut the covering material a trifle on the full size, as a surplus can be trimmed off afterwards.

A metal half button can be fitted to the left side of the table top, underneath, shown in dotted outline in Fig. 2, to prevent the top lifting up should it be necessary to shift the position of the table.

The picture, as everyone knows, is illuminated from behind and projected on to the screen through a lens. As regards the sound, what happens, briefly, is that the track passes in front of a lamp shining through a narrow slit. The resulting fluctuations of light shine on to a photo-electric cell which converts them into fluctuations of electricity, to be amplified and reproduced as the original sound.

The Craftsman.



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# HOBBIES IN PICTURES



(Photo: Macclesfield Courier)

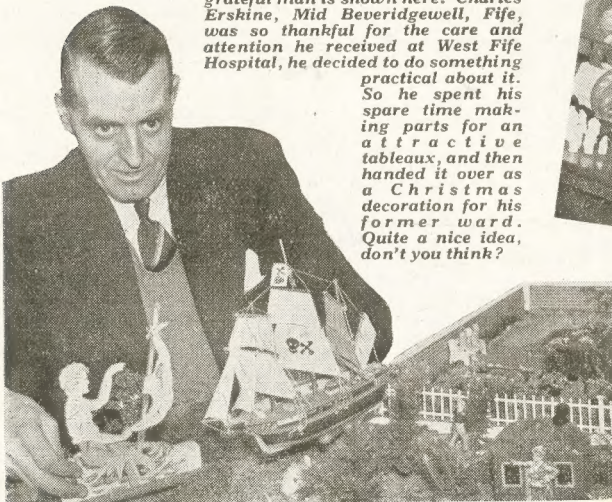
**I**F you have a quarry handy you may be able to get odd pieces of stone with which to take up a hobby such as Percy Cotterell whom you see here at his. All kinds of structures and buildings are made, the tiny 'bricks' being individually shaped and laid to form an artistic and attractive whole. Granite, marble, or any local stone can be used, and all kinds of garden ornaments can be made. Mr. Cotterell is still happy at his hobby at 72 years of age.

**T**HE gentleman with the Jeweller's magnifying glass is James Drysdale, Sighthill, Scotland, examining his galleon, clipper and a steamer sealed in a test tube no longer than a matchbox. Mr. Drysdale has only one hand—losing his right arm on the Normandy beaches. Here you see the models in aspirin bottles and dye tubes, made only with penknife and razor blade.



(Photo: Evening Dispatch, Edinburgh)

**H**OW often a prolonged spell in hospital is the beginning of a pleasant hobby. There is quite a range which patients can undertake, and the result of one by a grateful man is shown here. Charles Erskine, Mid Beveridge, Fife, was so thankful for the care and attention he received at West Fife Hospital, he decided to do something practical about it. So he spent his spare time making parts for an attractive tableau, and then handed it over as a Christmas decoration for his former ward. Quite a nice idea, don't you think?



(Picture by West Fife Photos)



**T**HE usefulness of models in architecture has always been stressed in these pages. Here is an example of it in national life. The picture shows you a model of the replanned High Altar in the Library of the Cathedral. The model is of the whole of the proposed changes at the east end, and is built to a scale of 1 in. to 1 ft. It shows the complete Sanctuary and the design of the American Memorial Chapel.

THE EDITOR IS ALWAYS PLEASED TO RECEIVE PICTURES OF UNUSUAL OR MERITORIOUS MODELS, OR WORK, LIKELY TO BE OF INTEREST TO OTHER READERS.



(Photo: Nottingham Journal Ltd.)

**A** PICTURE of toys which are poured out of a tin of parts and then suitably and attractively coloured, by their capable manufacturer, William Hyatt, of Smith Street, Mansfield, Notts. There are miniatures (some only about 1 1/2 ins. high) of dwarfs, bears, etc., and you see, it's quite a family affair, and has the advantage of being a table-top hobby, although Mr. Hyatt has made larger figures—Snow White's dwarfs, for instance—as garden ornaments.



# Books to Read!

A review of interesting books for craftsmen which have been recently published. Obtainable through newsagents or book-sellers or direct from the publishers mentioned.

## Painting and Lining Models

by R. C. Rogers

ALL too frequently the models we have to examine or see are more or less spoiled by the poor standard of finish, and we are constantly reiterating in these pages the need for care and attention in the final stages of painting or varnishing. Here is a book every enthusiastic model maker should have if he really desires to improve his results and be able to equal those professional results which all admire. The chapters deal with materials, equipment, letter, lining, varnishing, etc., as well as the technique of the various materials in use, and many helpful drawings provide further details. Whilst much of the matter deals with professional methods, the author, who is an expert modeller himself, shows how many of them can successfully be utilized or adapted by the amateur. The book is of pocket size for convenience and was first published toward the end of last year.

Published by Percival Marshall & Co. Ltd., 23 Great Queen Street, London, W.C.2—Price 3/6

## Carpentry for Beginners

by Charles H. Hayward

WE are always pleased to bring to the attention of readers, a new book by this well-known author. He has such a happy way of explanation—an everyday approach to involved as well as ordinary subjects that the beginner knows quite easily what he is doing, and can really enjoy the occupation. There are clear helpful drawings on all its 200 pages, and—as though for good measure—some more are printed on the inside covers and end papers. The book is particularly useful to the home craftsman because details are given for dozens of everyday things to make—from a tea tray to a poultry run. There are particulars about wood, tools, hinges, and a hundred and one hints on all kinds of jobs. Well printed and bound, such a book can last a life time and never cease to provide information and assistance to any home woodworker.

Published by Evan Brothers Ltd., Montague House, Russell Square, London, W.C.1—Price 7/6

## Mechanics for the Home Student

by Eric N. Simons

THE very title of the book is apt to frighten unduly those whose interests are more in lighter subjects, but there is certainly no cause for trepidation. The author sets out to deal with academic subjects in such a way that they

become really interesting! The elementary laws of mechanics as set out here in plain language and enhanced by simple drawings are so easily understood, that there is no feeling of being 'taught' but rather one is realizing what an addition to knowledge can be obtained by such easy means. Its 150 pages are packed with information, and although one is not recommended to go from beginning to end at one mouthful, each chapter is an interesting and complete analysis of the particular subject with which it deals, set out in pleasing and informative way. But although written in such easily-understood language, the facts are correct, because they are vouched for by W. A. Burnet, B.Eng., who is lecturer in Mechanical Engineering, at the University of Sheffield. Published by Iliffe and Sons, Ltd., Dorset House, Stamford Street, London, S.E.1—Price 7/6

## Garden Railways

by R. E. Tustin

WHEN one speaks of open-air railways, the uninitiated imagine a place as large as a park is necessary, with a proportionately large outlay and operational expense. The author shows how a fascinating model railway in O Gauge can be built and maintained comparatively inexpensively in an ordinary suburban back garden. His own has been in use for more than ten years, and the details and illustrations are largely based on his experiences and experiments. There is something particularly fascinating in constructing a garden railway and the various 'snags' and problems which may arise are dealt with and overcome for the reader so he can begin, with confidence, to erect his own system, without fear of being taken over by the Government! Chapters deal with all aspects of the work from a study of the soil to cover likelihood of subsidence at the beginning to the running of your rolling stock amidst a lay-out of miniature ponds,

## Design for a Pair of Book-ends

The making of a handsome Pair of Book-ends is simple with the full size patterns on this week's supplement sheet and the complete kit supplied. This kit of materials (No. 2838) costs only 5/9 from any Hobbies Branch or 6/6 post free from Hobbies Ltd., Dereham, Norfolk.

streams and rockeries. The photographs and diagrams make the whole thing very easy.

Published by Percival Marshall & Co. Ltd., 23 Great Queen Street, London, W.C.2—Price 10/6

## Plastics for the Craftworker

by Graham Fisher

NO doubt every reader has seen the delightful examples of plastic work—cigarette boxes, electric lamp holders, etc.—and wanted to make them for himself. This book tells you all about it, but at the same time the author is wise enough to warn the beginner not to attempt to run before he can walk. Modern plastics can be converted to many useful articles, but the cutting, shaping and polishing must be learned correctly and in proper stages. The way to do it is explained by the author in non-technical language. Commencing with simple serviette rings he elaborates on the processes and ability, warning you of 'snags' and solving difficulties, until you are able to undertake the beautiful pendant room light he illustrates and explains.

Published by Matson's Publications, St. Ives, Huntingdon—Price 5/-

## The Model Boat Book

by G. H. Deason

DURING the course of the summer, and, indeed, almost all the year round, we are constantly replying to readers who want to make for themselves, or their small families a real boat of some kind. Here is a book which would solve the problem of anyone so minded. Indeed, it would do more. Its 128 pages offer suggestions on such a wide range of models that the craftsman would have a fanatical urge to make every one, and be hard pressed to decide on which one to start. Apart from the boats themselves, methods of propulsion are covered in full—sails, rubber motors, electric, clockwork, internal combustion and even steam operated drive. There are details for making a variety of sailing craft, launches of almost all types (and there are quite a number), hydroplanes and even an R.A.F. tender. Instructions are enhanced by excellent photographs and diagrammatic drawings, all being beautifully printed on art paper and bound in strong cover. In many cases, too, it is possible to obtain large blue prints where patterns are shown actual size of the needed parts.

Published by The Drysdale Press, The Aerodrome, Billington Road, Stanbridge, Nr. Leighton Buzzard, Beds.—Price 7/6



# A handy holdall makes space for cottons, etc., in this SCISSORS CABINET

WHEN a button comes off or some other accident happens to your clothes it is most annoying to have to hunt all over the place for needle, cotton and scissors. Different people borrow these goods and more often than not do not put them back in their proper place—or, perhaps, they have not got a proper place.

The neat little wall cabinet shown and described here, if hung in a convenient spot, will save a lot of running about and also help to keep the house tidy. It has slots for two pairs of scissors and in the centre a small cupboard to contain all the necessary needlework accessories. It is interesting to note the shape of the door to this cupboard—the sloping sides make it self closing, which is an advantage in view of tidiness.

The design is quite simple and its construction well within the range of the average handyman. The choice of wood must be left entirely to the maker—the

For these cut two pieces of wood  $4\frac{1}{2}$  ins. long, 3 ins. wide at one end and  $2\frac{1}{2}$  ins. at the other, the taper being on one side only. The wood is  $\frac{3}{4}$  in. thick, which will allow for a  $\frac{1}{2}$  in. deep tapered slot to be cut out for the scissors. For most scissors a slot 1 in. wide at the top, tapering to  $\frac{3}{4}$  in. at the bottom, is quite suitable, but it is possible that your scissors are different and may require a little alteration.

Do not forget when cutting these pieces that they are opposites and must not be cut both the same. Before fixing the side pieces on to the back, the slots should be well smoothed with glasspaper. Then they can be glued on and held secure with a few small panel pins from the back.



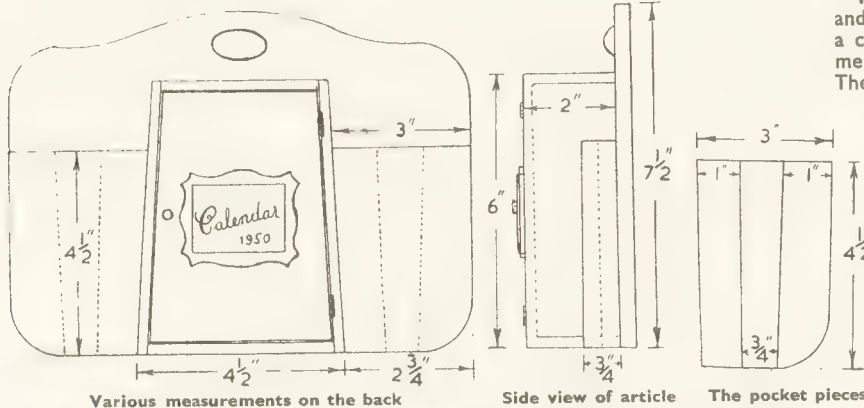
The door does not need to be thicker than about  $\frac{1}{2}$  in. and is made to fit easily inside the framework. To keep the door from being pushed right in, a thin slip of wood is fixed to the four sides to form a stop.

To relieve the plainness of the door and also to make the cabinet more useful, a calendar pad is attached to an ornamental overlay of thin wood, as seen. The cabinet is made to hang on the wall, two holes being drilled in the backboard inside the cupboard part for that purpose.

Inside the cupboard a little fitting out is necessary. Two shelves will probably be sufficient to hold most of the various items needed. A small drawer or two would be very nice additions but that is a point you must decide for yourself.

A very useful fitment is a pin-cushion which can be fixed on to the inside of the door, and could very well occupy nearly all the space. Cut a piece of cardboard to the size you decide to make it, cut a thin piece of wadding to the same size and cover the whole with a piece of velvet, leaving about  $\frac{1}{2}$  in. all round to turn over and glue down. The card is then glued to the door.

Finishing must be left to individual fancy, as this depends upon the kind of wood used and may call for french polishing, staining, varnishing or enamelling.



ideal being to make it to match the other furniture in the room.

All the parts are securely fixed on to the back, which is 10 ins. long,  $7\frac{1}{2}$  ins. wide and about  $\frac{3}{4}$  in. thick, either in one piece or two glued together, or even plywood. The making of the cupboard will be easier if you cut and fix the holders for the scissors, on either side, first of all.

The framework of the cupboard is made from wood 2 ins. wide and  $\frac{1}{4}$  in. thick. The two sides are 6 ins. long and can be glued in position before cutting the top and bottom. These pieces had better be made too long and then cut to fit—the approximate sizes being  $3\frac{1}{2}$  ins. for the top and 4 ins. for the bottom. If you care to mitre the corners, they will need to be about  $\frac{1}{2}$  in. longer.

## Mains Conversion—(Continued from page 391)

pentode valve in the output stage, if desired, and this will give some extra amplification.

The receiver now requires 250 volts high tension, plus 4 volts 2 amps. for filaments. These supplies are obtained from the circuit shown in Fig. 3. New parts will be required here, but the cost of these will be repaid in twelve months or so, if set against the batteries which would have been necessary.

The whole unit may be built up on a small wooden baseboard. A toggle switch is wired in series with one mains lead, for on/off switching. The mains trans-

former is of the usual type, and has several windings. One of these (leads marked XX) will be connected to leads XX in Fig. 2, to supply the valve heaters. If 4 volt valves are used, this should be a 4 volt winding; but if 6.3 volt valves are employed, then a transformer with a 6.3 volt winding should be obtained instead.

A further small winding supplies the filament of the rectifier, and for a valve such as the Osram MU12, a 4 volt winding is required. \* The remaining winding is that which supplies the high tension, and is 250 volts, centre tapped. The

centre tap is marked 'C.T.' and becomes H.T. Negative.

The rectifier centre tapped filament winding provides the H.T. Positive point, which is smoothed by the choke and condensers to remove hum. Any small smoothing choke is suitable for a 2- or 3-valver. Note the polarity of the smoothing condensers must be observed when wiring up.

When plugged in and switched on, the whole receiver should work as before but at increased volume. The valves will require about thirty seconds to reach operating temperature.



# The revolving fan is a fascinating part of A THERMAL LAMP

**A** NOVEL lamp for the study, nursery or for display purposes, is the thermal with its revolving shade. Its mode of operation is quite simple. The ascending hot air arising from the incandescent bulb actuates a rotor which is attached to the lamp-shade, and so slowly and steadily revolves the assembly for as long as the bulb is in use.

The lamp is not difficult to make and by painting or affixing various figures on the shade, it will provide endless amusement for the family. Before proceeding to the constructional details, it should be stated that owing to the many diverse sizes of lamp-holders and shades, no actual dimensions will be quoted, as the reader can quite easily formulate these to suit his own individual requirements.

## Metal Rotor

As can be seen from the illustration at Fig. 1, a small rotor is fitted to the top of the lamp-shade. The rotor is made

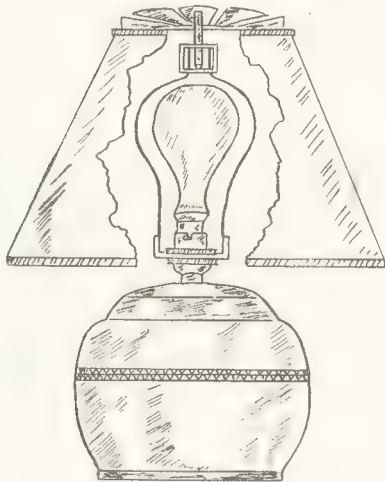


Fig. 1—Cut away view to show 'works'

from thin brass or tinplate to the pattern as shown in Fig. 2 A. A small hole is drilled at the bottom of each cut to facilitate the bending of the vanes. These should be carefully bent to approximately 30 degrees angle.

A small hole is drilled in the centre of the rotor to take the spindle (see Fig. 2 B). This is constructed from a french nail with its point carefully smoothed and trued up with a fine file, afterwards finishing with emery paper. The head of the nail is next removed and the spindle passed through the hole in the rotor and soldered into place.

The complete assembly can now be given a coat of enamel if desired, and placed on one side to harden thoroughly. A good cellulose enamel is preferable, as

the oil-base variety is apt to soften with the heat of the lamp and make rather an unpleasant smell. The bearing surfaces of the spindle should not, of course, be painted.

## The Bearing

The bearing assembly (Fig. 2 C) is constructed from brass of  $\frac{1}{16}$  in. thickness to the shape shown in the illustration. A central hole, slightly larger in diameter than the spindle is drilled in the top of the assembly (Fig. 2 D) and a slight depression made in the lower part concentric with the upper hole (Fig. 2 E). The rotor unit should now be inserted and tried in the bearing.

The point of the spindle should fit accurately into the depression and the whole unit should spin rapidly when gently blown upon. If the impeller is not absolutely free, the upper bearing hole should be lightly enlarged until the results are satisfactory. Do not, however, enlarge the hole too much, as this will permit excessive side-play and cause poor and erratic running.

## Tongued Ring

Four small holes are next drilled in the bearing assembly to take the lamp-brackets (Fig. 2 F). The bracket (Fig. 2 G) is made by cutting a ring from either heavy tin-plate or brass. Two projections or tongues diametrically opposed, are incorporated in the ring, and are carefully bent at right-angles. The tongues are then bent or shaped around two lengths of stiff wire and the whole sweated together with solder.

The assembly is then placed into position on the lamp-standard and the locking collar tightened down. The wires are brought up into position to the bearing location, passed through their respective holes and well soldered in. In this way, a particularly sturdy and robust ensemble is assured.

Remember, however, to allow sufficient clearance for the bulb when shaping the bracket-wires. Also, the spindle bearing should be located as near the bulb as possible, to take full advantage of the rising hot air.

The rotor vanes are next lightly soldered to the upper framework of the shade, then the whole carefully placed into position on the lamp. A spot of very light oil is applied to both the bearing points, and the lamp is ready for use.

## Lamp for Heat

A 75watt bulb should give sufficient



Note the fan at the top of the lamp shade

radiation to work the lamp perfectly satisfactory. Should the movement be sluggish, either increase the wattage of the bulb, or slightly increase the pitch of the vanes by gently bending. The maximum thrust is obtained at approximately 45 degrees angle, and the pitch should not, of course, exceed this optimum. The lamp will not commence revolving immediately it is switched on, as the heat radiation takes a few seconds to attain its maximum value.

## Light and Smooth

As the motive power is so minute, it should be emphasised that all components such as the shade, etc., must be as light as possible, and that bearing friction must be almost non-existent.

The moving parts must, of course, be perfectly balanced so the shade revolves evenly and smoothly. The great thing to watch is that the pivot point is quite

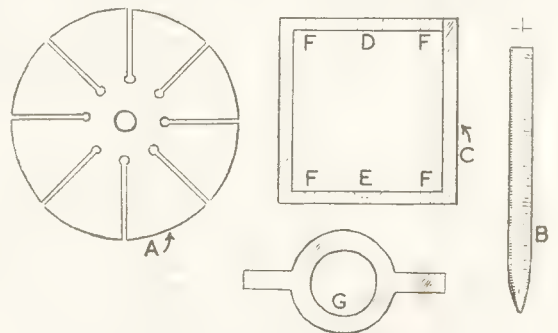


Fig. 2—Shape and details of working parts

smooth, and that the depression in which it fits does not bind in any way. All these matters will have to be attended to carefully.



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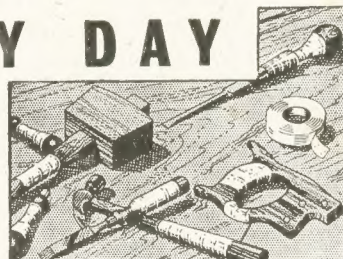


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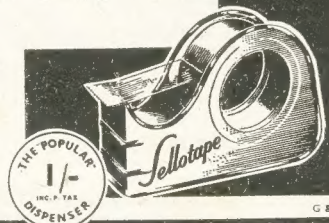
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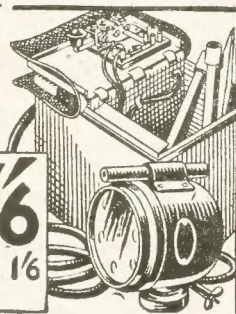
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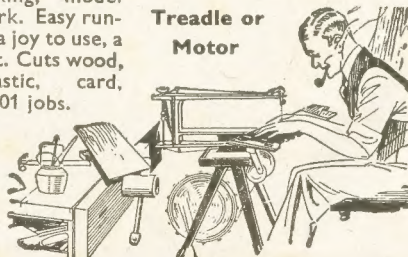
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